



Washington Park Arboretum

BULLETIN

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— Washington Park Arboretum —

The Arboretum is a 230-acre dynamic garden of trees and shrubs, displaying internationally renowned collections of oaks, conifers, camellias, Japanese and other maples, hollies and a profusion of woody plants from the Pacific Northwest and around the world. Aesthetic enjoyment gracefully co-exists with science in this spectacular urban green space on the shores of Lake Washington. Visitors come to learn, explore, relax or reflect in Seattle’s largest public garden.

The Washington Park Arboretum is managed cooperatively by the University of Washington Botanic Gardens and Seattle Parks and Recreation; the Arboretum Foundation is its major support organization.

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The Arboretum Foundation’s mission is to create and strengthen an engaged community of donors, volunteers and advocates who will promote, protect and enhance the Washington Park Arboretum for current and future generations.

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The University of Washington manages the Arboretum’s collections, horticultural programs, facilities and education programs through the University of Washington Botanic Gardens. It owns some of the land and buildings and all of the collections.

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The City of Seattle owns most of the Arboretum’s land and buildings. Seattle Parks and Recreation is responsible for park functions throughout the Arboretum. It also manages the 3.5-acre Seattle Japanese Garden within the Arboretum, in partnership with the Arboretum Foundation.

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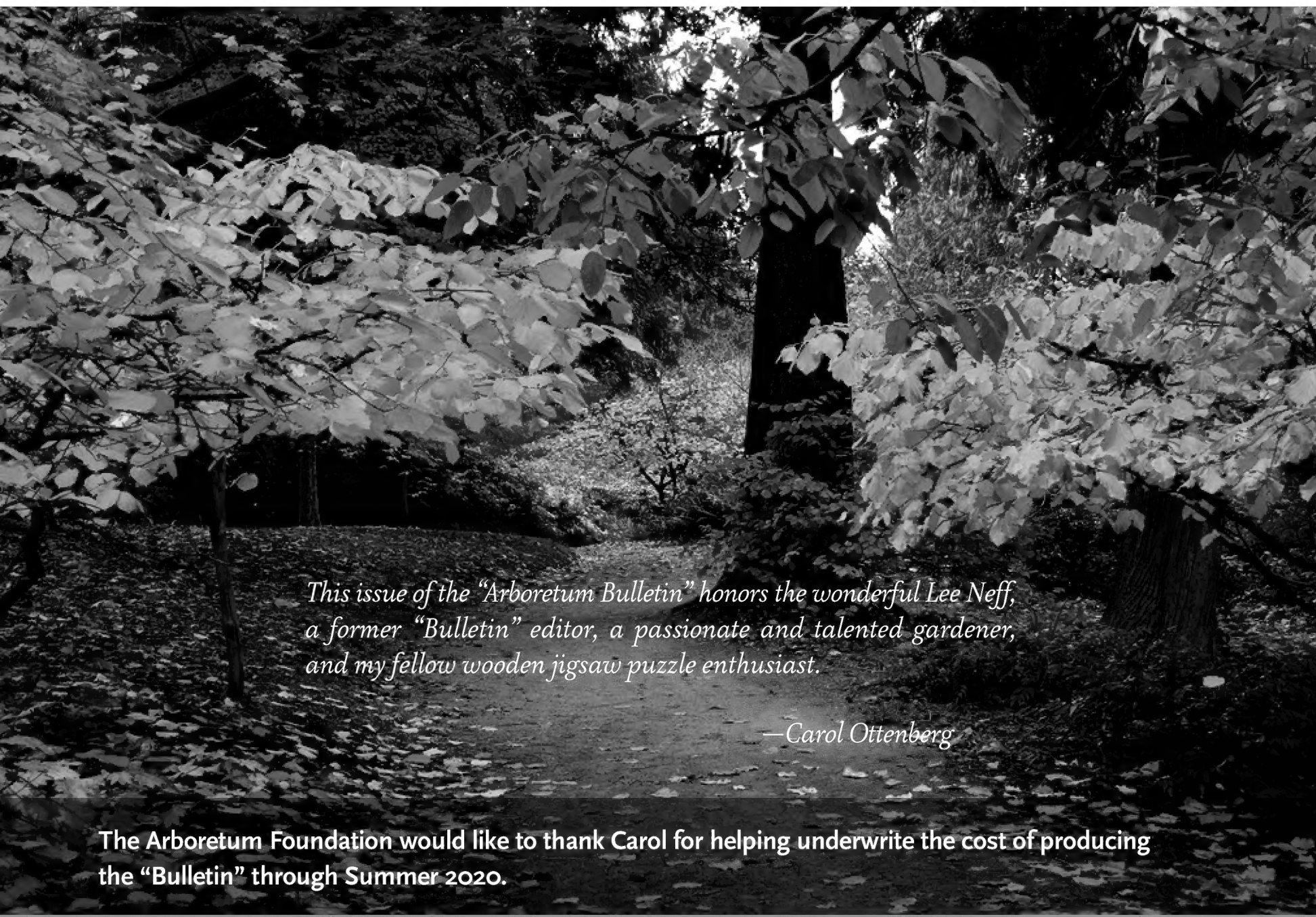
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This issue of the “Arboretum Bulletin” honors the wonderful Lee Neff, a former “Bulletin” editor, a passionate and talented gardener, and my fellow wooden jigsaw puzzle enthusiast.

—Carol Ottenberg

The Arboretum Foundation would like to thank Carol for helping underwrite the cost of producing the “Bulletin” through Summer 2020.

ON THE COVER: Contrasting fall colors in the Pinetum, with *Ginkgo biloba* in the foreground and bald cypress (*Taxodium distichum*), a deciduous conifer, in the background. (Photo by Niall Dunne)



The Next Leg of the Journey

Armchair travelers will find many things to enjoy in this issue of the “Bulletin.” Walt Bubelis shares tales of garden adventures in the Southeast, Brian Thompson reviews books about modern-day botanical explorers, and Panayoti Kelaidis reminisces about his trips to the fabulous nurseries all around the Puget Sound.

I’ve had a bit of a journey, too. Since my last “Bulletin” letter in June, my title has gotten a little shorter with the removal of “Interim.” I’m thrilled to be continuing at the helm of the Arboretum Foundation and partnering with all of you in the stewardship of this inspiring urban treasure.

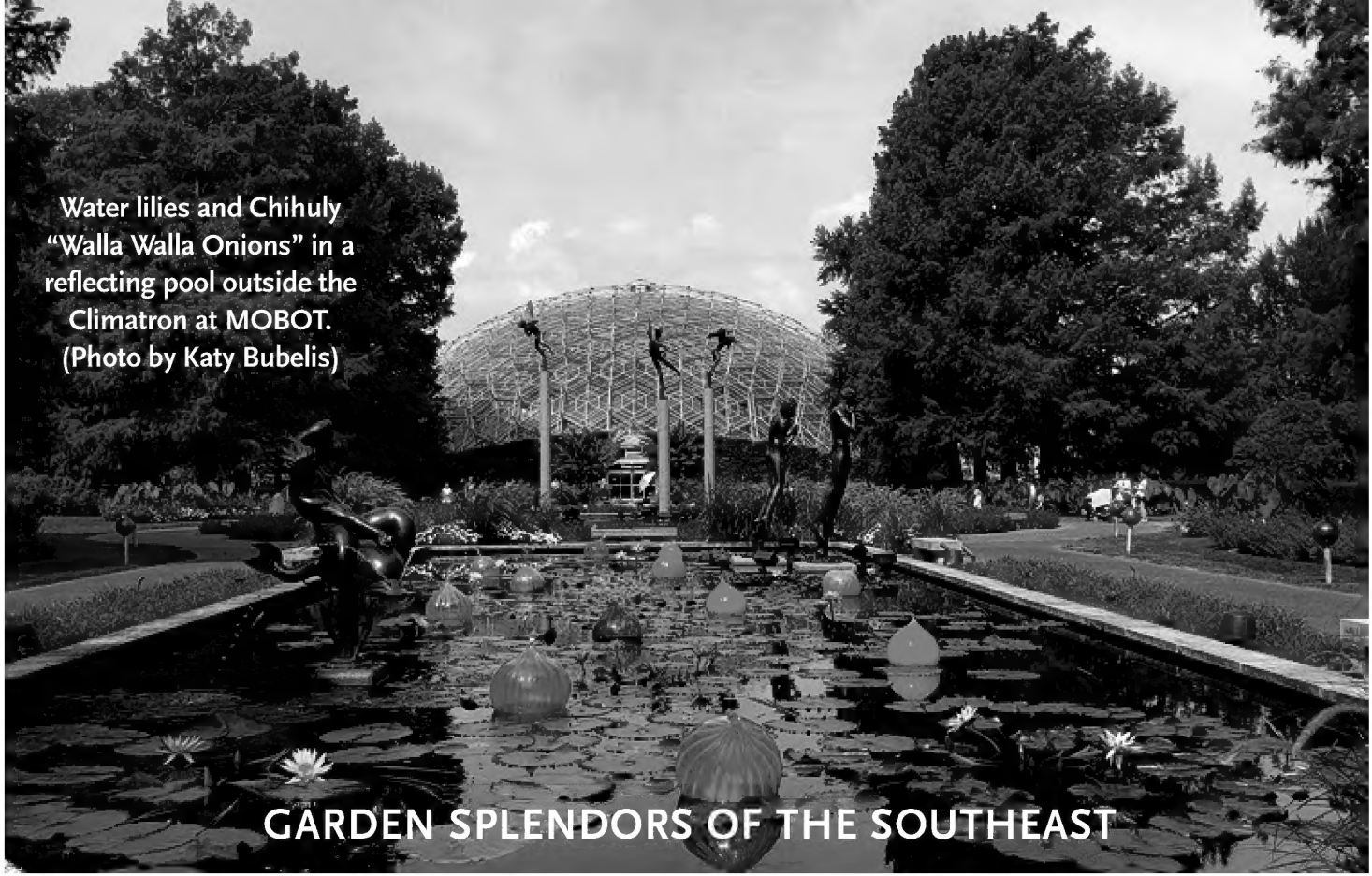
The two years I spent as the Interim Director were a useful and appropriate interlude in several ways. On the personal side, my nest emptied, and I lost my last surviving parent. Many of you will identify with the poignancy of these transitions and the need to acknowledge the changes without being paralyzed by them. Similarly, with leadership changes at the helm of all three Arboretum partners, it was a time for the team to take a breath and get a sharper focus on the horizon ahead.

So where might the next stage of the journey lead? Certainly the need to preserve unique spaces like the Arboretum that showcase the world’s biodiversity, the need to demonstrate environmental leadership relative to climate science and our watershed, and the need to provide welcoming, relevant access to a broad cross-section of the community have never felt like more necessary and compelling mandates.

I believe the best journeys start with a good plan but allow for healthy input from fellow travelers and maybe a little serendipity along the way. I look forward to exploring the path with you.



Jane Stonecipher
Executive Director, Arboretum Foundation



Water lilies and Chihuly
“Walla Walla Onions” in a
reflecting pool outside the
Climatron at MOBOT.
(Photo by Katy Bubelis)

GARDEN SPLENDORS OF THE SOUTHEAST

A Road Trip from St. Louis to Asheville

BY WALT BUBELIS

Last summer, my wife and I went on a road trip in the southeastern U.S. Besides visiting art museums and historic sites along our route, we explored various botanic gardens—starting with one of the country’s premier public gardens, Missouri Botanical Garden (MOBOT), in St. Louis.

A lot is packed into MOBOT’s 69 acres, but it never feels crowded because the displays—ranging from aquatic gardens to children’s gardens to rose gardens—are so seamlessly placed. A must-see is the iconic Climatron, the first geodesic dome in the world to be used as a conservatory. Debuting in 1960, the half-acre dome is home to 1400 species of tropical plants and focuses on rainforest diversity and ecology.

MOBOT features a dizzying array of formal- and international-themed gardens. Unique to North America is the Ottoman Garden, a quarter-acre walled courtyard display filled with plants known to have been grown in 18th-century imperial gardens of the Ottoman Empire (present-day Turkey). In some cases, hardier natives replace their Mediterranean counterparts (for example, *Juniperus virginiana* ‘Taylor’ is substituted for the Italian cypress, *Cupressus sempervirens* ‘Stricta’), but this doesn’t detract from the overall effect.

Many amenities—such as a huge gift shop and nursery, excellent cafeteria, free tram service for visitors, and workshops for all ages—make a full-day trip to MOBOT worthwhile.

NEXT STOP TENNESSEE

The four major cities of Tennessee—Memphis, Nashville, Chattanooga and Knoxville—all have wonderful historic sights worthy of exploration. They also have beautiful parks and gardens, each with their own flavor but all dedicated to creating a welcoming feeling for visitors.

The Memphis Botanic Garden is definitely worth a visit. The 96-acre site has more than 30 specialty gardens ranging from impressive holly, daylily and hosta collections to a tranquil Japanese Garden and—for the young—the Prehistoric Plant Trail (complete with dinosaur statues and a sand pit for uncovering “fossils”).

The outdoor Desert Garden offers instructions on how to grow xerophytes (dry-adapted plants) in the humid South. There’s even an “Azalea Trail” (echoing our own Arboretum’s Azalea Way), which made us want to return for a visit in springtime.

CAPITOL CITY STUNNER

Nashville, the state capitol, like Memphis, is an active city with a long music tradition. Its botanic

garden, Cheekwood, in the western suburbs, is a masterful arrangement of space that makes the most of its 55 acres.

Native plants—especially endangered species such as the stinking cedar, *Torreya taxifolia*—are given special attention. Colorful borders, children’s play areas with model trains, 100-year-old boxwood gardens, an impressive dogwood collection, and a Japanese garden all add to the charm.

The Woodland Sculpture trail features a dozen or so large-scale pieces by renowned contemporary artists set along a one-mile woodland walk. Before departing, be sure to visit the Cheekwood mansion, which houses the collection of the Nashville Art Museum.



Swamp treehouse at the Reflection Riding Arboretum.
(Photo by Walt Bubelis)

CHATTANOOGA ENCHANTMENT

“The Battle Above the Clouds”—the nickname for a famous Civil War engagement fought on Lookout Mountain above the city of Chattanooga—has always intrigued me. So, I was pleased to finally visit the site. A long, winding road takes you up to Point Park at the top of the mountain (about 3000 feet up), from where you can get a wonderful view of the city and the loops of the Tennessee River to the north. Native plants such as redbud, sycamore, smilax and various oaks abound in the park.

Even more natives can be found below, on the west side of the mountain, in the Reflection Riding Arboretum and Nature Center. Named for the many horse trails that run along the adjacent Lookout Creek, the 317-acre garden



The striking half-moon bridge at the Japanese garden in Memphis Botanic Garden.
(Photo © H. Michael Miley/Flickr)

is planted within a diverse broadleaf forest and focuses on native plants and plant conservation.

From the visitors center, we chose the lowland swamp walk, which soon entered into a dark forest with boardwalks over the water. An amazing tree house built around a huge southern red oak (*Quercus falcata*) is a trail highlight. From the treehouse, we spotted slider turtles basking on a half-submerged log. With iconic bald cypress and other water-tolerant species all around us, we half-expected to see alligators, too.

On one of the roads through the preserve, we came across a stand of American chestnut (*Castanea americana*). This iconic tree was decimated by an imported fungus (chestnut blight) over one hundred years ago, and very few mature specimens still stand. Conservation efforts at Reflection Riding Arboretum, and elsewhere, focus on the search for resistant strains of the tree.

After Chattanooga, Knoxville was our next port of call. Regrettably, we didn’t get to visit its botanical garden and arboretum, but we did enjoy the sculpture garden around the Knoxville Museum of Art, as well as the period garden around the Blount Mansion. The mansion dates to the early 1790s and was the home of statesman William Blount, one of the signers of the U.S. Constitution.

BELLES OF THE BLUE RIDGE MOUNTAINS

Asheville, North Carolina is a mountain town well known for its music and crafts scene, but it is also famous for being the location of Biltmore, the largest private residence in the United States.





The quilt garden at the N.C. Arboretum mimics the shapes and colors found in traditional quilt block patterns.
(Photo by Walt Bubelis)

Built by George Vanderbilt in 1889–1896, the 250-room, chateau-style mansion is full of superlatives and well worth a tour.

The grounds and gardens are also noteworthy. The Vanderbilts hired Frederick Law Olmsted to devise a management plan for the logged-over, 125-thousand-acre parcel of land surrounding the mansion. Gifford Pinchot, later of U.S. Forest Service fame, was hired to manage the forested parkland that Olmsted envisioned.

Formal gardens and conservatories are found close to the mansion. A long arbor with sizeable wisterias leads visitors to the gardens and an equally long, rectangular pond, bounded by a huge, clipped hedge. Adding color to these scenes—both inside and out—are numerous glass balls and sculptures by our own Dale Chihuly.

You'll find a rose garden, conservatory and walled garden, and—as you move farther from the house—an expansive network of more informal gardens and natural areas.

But don't only visit Biltmore: The nearby North Carolina Arboretum is well worth a look, too. Only 30 years old, it has incorporated many of the best ideas from other botanic gardens into its 434 acres. Two handsome native limestone and wood buildings—one a visitors center, the other an educational center—greet you before you enter a well-laid-out series of theme gardens.

Local artisans have crafted intriguing sculptures, arbors, garden gates, bee hotels and much more around the Arboretum. There's a superb

bonsai collection, and visitors are invited to attend demonstrations and create their own bonsai treasures.

Also of note is the holly collection and the National Native Azalea Repository. The Plants of Promise Garden evaluates plants for the local gardening community. A first for me was seeing a cafeteria carrying a selection of local wines and IPAs.

As small as it is (with a population of 90 thousand), Asheville even has a third public garden, the 10-acre Botanical Gardens at Asheville, closer to the downtown core. It highlights plants native to the southern Appalachian Mountains. Well labeled and easy to access, the displays provide a particularly valuable introduction to native herbaceous plants, which are rarely given proper attention. Tall native trees and a stream running through the long, narrow property create a shady, humid microclimate that supports the Gardens' many ferns, trilliums, mosses and wildflowers.

SOUTHERN PLANT CHARM

On our journey, I noticed that many of the gardens we visited had a strong focus on teaching the how-tos of edible gardening, including raising bees and chickens. Families are encouraged to get their hands dirty through many short classes and demonstrations, and by interacting with specialty gardens focused on herbs, vegetables, fruit trees and more.

Seeing Southeastern native plants (many of which we grow here in the Northwest) in their natural habitats was quite rewarding. Besides learning about some new species, I became familiar with how these plants associate together in the wild. As we well know here—through our Pacific Connections Garden—recreating a plant community from another climate-appropriate region can make for an aesthetically and emotionally satisfying design. This is doubly true if you've spent time traveling through that region, enjoying its culture and creating lasting memories. 🌿

WALT BUBELIS is a professor emeritus in the Horticulture Department at Edmonds Community College. He is also a member of the "Bulletin" Editorial Board.

HIDDEN TREASURE OF THE ARBORETUM

Fall color starting to appear on daimyo oak foliage
in the Arboretum. (Photo by Daniel Mount)

Daimyo Oak

BY DANIEL MOUNT

We're all familiar with the expression "You can't see the forest for the trees." But I find that it can sometimes be hard to see the trees for the forest! This seems especially true in parts of the Arboretum, where mature collections have grown to massive proportions and much of the flowering and other fun stuff happens out of sight, way up in the canopy.

One section of the Arboretum where it can be tricky to appreciate the traits of individual trees is the Oak Collection. Just steps away from the Graham Visitors Center, it is an often overlooked corner of the park, except in autumn when you might find mushroom hunters rustling through the fallen leaves. (Note: Foraging is forbidden in Seattle city parks!)

A total of 316 oaks—representing around 80 species and cultivars—grow in the Arboretum, making the collection an important one. They can be found from one end of the park to the other, but the highest concentration is just to the west of the Visitors Center, and many of these trees date back to the early days of the Arboretum. All our oaks are part of a nationally accredited multi-site collection administered through the Plant Collections Network of the American Public Garden Association.

There are many rarities in the Arboretum collection, but one oak in particular is of special interest for its stunningly large leaves—the daimyo oak (*Quercus dentata*). It is also known as Korean oak and Japanese emperor oak (*daimyo* were powerful feudal rulers in Japan, from the 10th to mid-19th centuries). As you might have guessed, the tree is native to Japan and Korea; it is also found in the wilds of northeastern China.

Our specimens arrived as fresh seeds in the fall of 1937 from Mrs. O.B. Thorgrimson, who received them from the Arnold Arboretum. (Thorgrimson was one of the original advocates for the Arboretum back in its infancy.) Upon receipt, they were planted immediately in the nursery because acorns have a very short viability period. In the spring of 1946, the young trees were planted out in the Arboretum. Five still stand today at the northeast end of service road that runs through the Oak Collection; another three from the original batch can be found at the south end of the collection, on the west side of the Loop Trail, just south of the Wilcox Bridge.



TOP: Daimyo oak leaves are among the largest in the genus *Quercus*. (Photo by Niall Dunne)



BOTTOM: The hedgehog-like acorns. (Photo by Daniel Mount)

Most are veritable giants today, ranging between 40 and 60 feet. They offer beautiful corky bark and very large, broadly lobed, egg-shaped leaves. The leaves are among the largest in the genus, reaching up to a foot long and seven inches wide when fully expanded. Another salient feature is the acorns, whose bristly cupolas cover nearly half of the nut, making them look like little hedgehogs when they fall among the leaves come autumn.

Given its scientific name in 1784 by Carl Peter Thunberg—the Swedish botanist who was one of the first Europeans to gain access to Japanese plants—daimyo oak did not arrive in the West until decades later. Often planted in parks and arboreta in the 19th and early 20th centuries, it is

not currently thought of as a very garden-worthy plant. For one thing, its large size at maturity makes it unsuitable for most urban gardens. What's more, its eventual shape can be somewhat angular and irregular. In his “Trees and Shrubs Hardy in the British Isles,” W.J. Bean wrote: “of ungainly and un-picturesque habit when old.”

A couple of very slow-growing cultivars—*Quercus dentata* ‘Carl Ferris Miller’ and ‘Pinnatifida’—have been selected, and these are unlikely to expand out of proportion in the average garden. In addition, their forms are more desirable: ‘Carl Ferris Miller’ develops an oval-to-rounded crown, while ‘Pinnatifida’, sometimes called the cutleaf emperor oak, has a narrow, upright habit. The latter also bears stunning, deeply cleft, fernlike leaves that are very unusual among oaks.

In Japan, daimyo oak is frequently found in gardens; but there it is judiciously pruned to keep its size small and its shape appealing. The Japanese also use the tree for bonsai, and each May, in celebration of Children's Day, they serve a special sweet called *kashiwa mochi* (sticky rice cakes filled with red bean jam) wrapped in the large oak leaves.

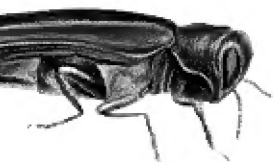
Daimyo oak does best in full sun and acidic, well-drained soil. It can be hard to come by in local nurseries, but thanks to the foresight of the Arboretum's first supporters and staff, the plant is easily found here. What's more, our specimens have been allowed to retain their lower branches, so the fabulous foliage is easy to appreciate from ground level. While you're visiting, check out some of the other wonderful oaks in our nationally important collection. 🌿

DANIEL MOUNT is an estate gardener, garden writer and member of the “Bulletin” Editorial Board. He lives on a small farm in the Snoqualmie Valley. Read more of his reflections on plants and gardening at www.mountgardens.com.

Neighborhood trees in St. Paul, Minnesota, devastated by the emerald ash borer in 2009. (Photo courtesy David Joles/Star Tribune)

Invasive Insects of the Pacific Northwest

BY PATRICK C. TOBIN



The Anthropocene. It's a proposed new name (not yet formally accepted) for the current period in Earth's geologic history. Meaning "human epoch," it signifies that people have become the dominant influence on global ecosystems. Its start date remains a topic of debate: Some argue that the Anthropocene began around 8000 years ago, when our nomadic ancestors first settled down, cleared land, and cultivated crops; others have suggested a more recent starting point, such as the Industrial Revolution—and even the detonation of the first nuclear weapon.

As an invasion biologist, I have often considered that the Anthropocene began with long-distance trade pathways and the movement by humans of plants and animals far beyond their distributional ranges. For example, the Silk Road connected much of Asia with North Africa and Europe over 2200 years ago, and sailing ships in the 15th century linked goods from around the

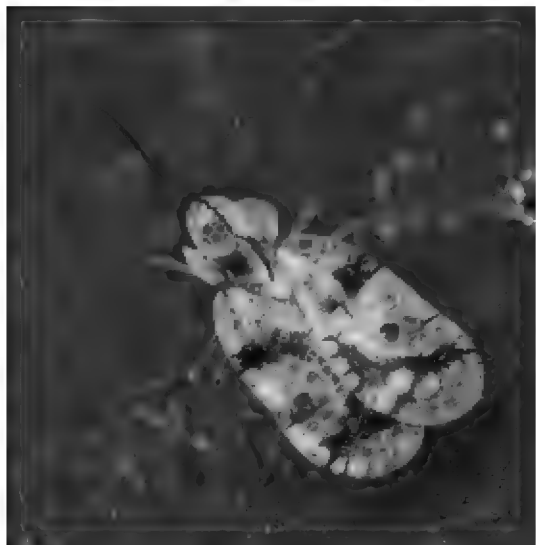
world. Some introduced species certainly had their benefits; after all, many food crops in North America are non-native plants. However, some introduced species—and hitchhikers like the much maligned brown rat—became invasive in their new territory, spreading widely and causing major ecological harm to native ecosystems.

Fortunately, only a minority of introduced species become invasive. Most estimates suggest that only about 20 percent of non-native species have any measurable negative impact, and only about half of these have extremely negative effects. In North America, for example, there are more than 3400 documented non-native insects (including the beneficial European honey bee), but only about 10 to 12 percent of these are causing significant damage.

In the Pacific Northwest, we are certainly not immune to the global problem of invasive species. Following are profiles of some invasive insect species that are 1) already here and

causing problems, 2) here, but not yet causing significant problems, or 3) not here, but represent looming threats.

INVASIVE INSECTS HERE AND CAUSING PROBLEMS



Adult azalea lace bugs measure about 3mm long. (Photo courtesy Eric Gofreed/bugguide.net)

Azalea lace bug, *Stephanitis pyrioides*

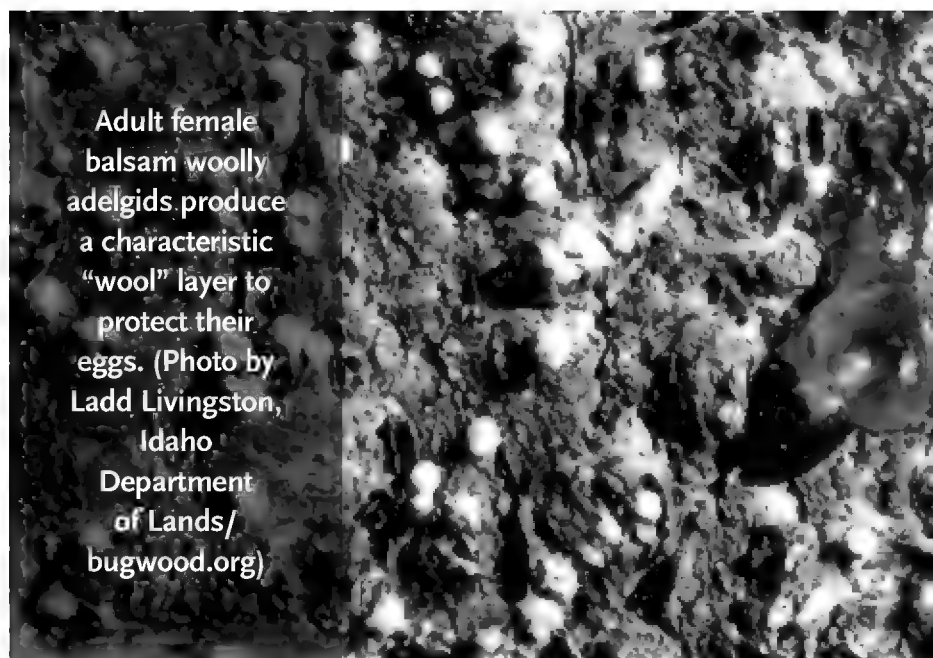
Most plant enthusiasts in the Pacific Northwest likely know about this insect or have seen its damage on *Rhododendron* species. It is an extremely small (adults measure 1/8 to 1/4 inches long) and—with its colorful, gauze-like wings—quite attractive member of the insect order Hemiptera (the true bugs), which also includes aphids, cicadas and stinkbugs. Not to be confused with lacewings, which are beneficial predators of many plant pests, azalea lace bug is a plant pest from Japan that was accidentally introduced to the U.S., likely on infested nursery stock.

First reported in New Jersey in 1915, it quickly became one of the most serious insect pests of *Rhododendron* species, particularly azaleas. Battles have been waged against this insect all along the eastern seaboard, from New Jersey to the U.S. National Arboretum to Augusta National Golf Club. Finally, in 2008, its presence was confirmed in the Pacific Northwest.

Eggs of the lace bug overwinter on *Rhododendron* foliage and hatch in spring. Then the insect goes through several nymphal stages before emerging as an adult. It likely completes at least two to three generations per year in our region. Both nymphs and adults colonize the undersides of leaves and damage their host

plant by piercing the foliage and destroying the mesophyll—or inner tissue where much of the plant's photosynthesis occurs. Infested leaves have a stippled appearance, and heavy infestations can result in chlorosis (loss of green coloration) and leaf drop, greatly decreasing a plant's vitality and reducing its aesthetic qualities. Severe infestations, or infestations in susceptible cultivars, can result in plant death.

Studies of the insect are currently taking place at the Washington Park Arboretum. Led by UW Botanic Gardens IPM Coordinator (and M.S. student at University of Washington) Ryan Garrison, the research seeks to shed light on the lace bug's phenology in our region, and to identify resistant *Rhododendron* species and cultivars. Look for Ryan's results in a future issue of the "Arboretum Bulletin"!



Adult female balsam woolly adelgids produce a characteristic "wool" layer to protect their eggs. (Photo by Ladd Livingston, Idaho Department of Lands/bugwood.org)

Balsam woolly adelgid, *Adelges piceae*

Balsam woolly adelgid is another tiny insect—about one millimeter in length as an adult—that has caused much damage in our region. Native to Europe, it arrived in New England around 1900, was confirmed in California by 1928, and then in the Willamette Valley by 1930. It is currently found all over the Pacific Northwest, where it attacks true firs (*Abies* species) such as our native grand fir, Pacific silver fir and subalpine fir. It's also a serious pest of the Christmas tree industry, with balsam fir and fraser fir (both native to the eastern U.S.) particularly susceptible.

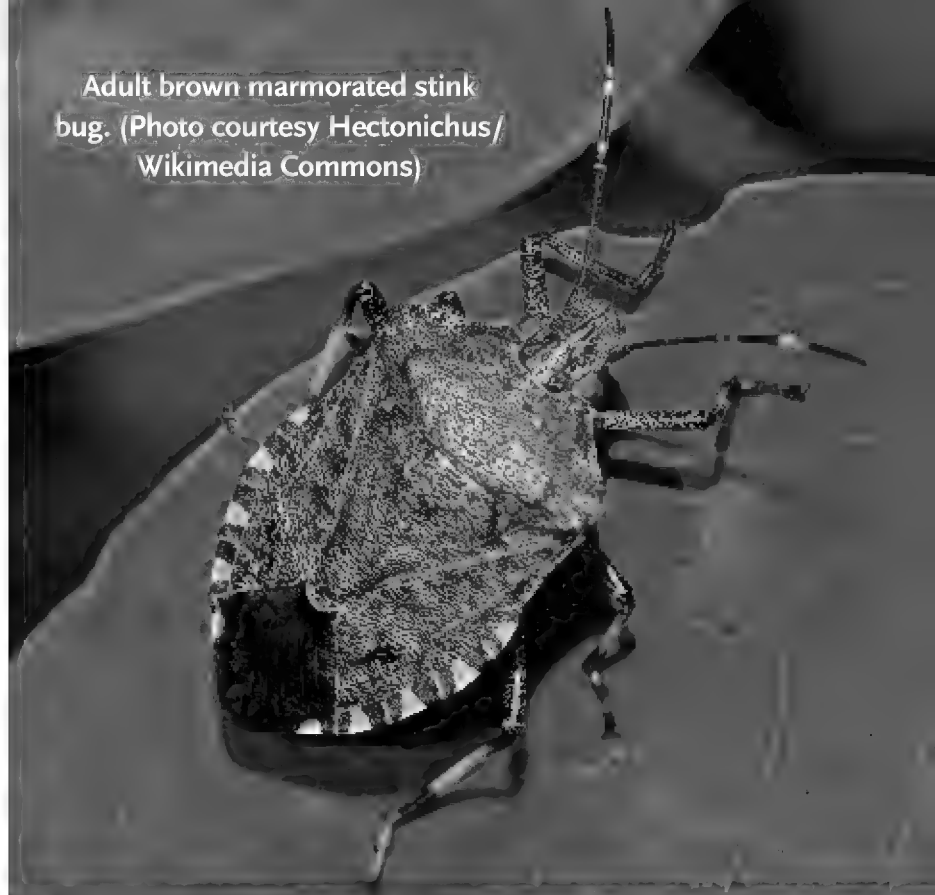


The insect shares the same taxonomic order as the azalea lace bug (Hemiptera) and is in the Adelgidae family, making it a close relative of aphids. As a family, adelgids are a bit bizarre. Many species, including the balsam woolly adelgid, are parthenogenic, meaning the females can reproduce without fertilization by males. What's more, adelgids are largely immobile except for the newly hatched nymphs, called crawlers. Once they hatch, crawlers locate a suitable feeding spot on a plant, insert their mouthpart (much like a mosquito might insert their mouthpart into you), and feed on the sap. Never moving again, the crawlers develop into new mothers and lay eggs for the next generation.

Each female adelgid can produce up to 200 eggs per clutch. In most areas of the Pacific Northwest, balsam woolly adelgid produces two generations per year. In warm, lowland valleys, that number may increase to four. Added together, that's a lot of adelgids! Adult insects are purplish and difficult to see with the naked eye. However, their dense, white, wool-like protective secretions make an infection easy enough to spot. Both the eggs and crawlers are a more conspicuous amber color.

When the balsam woolly adelgid began to spread over the Pacific Northwest, heavy tree mortality was observed in the Cascades, especially in the 1950s and 1960s. In recent years, the mortality rate has declined, perhaps because the most susceptible trees have already succumbed to attack and died. However, this species continues to cause damage in our region each year—and climate warming may exacerbate the problem.

Historically, balsam woolly adelgid was largely confined to elevations under 6000 feet. Warmer winters might allow it to invade new forests that were once climatically unsuitable for them. This scenario would be similar to the unprecedented outbreak of the native mountain pine beetle in British Columbia—which was able to move and survive farther northward, and at higher elevations, owing to warming winters.



Adult brown marmorated stink bug. (Photo courtesy Hectonichus/ Wikimedia Commons)

INVASIVE INSECTS HERE BUT NOT YET CAUSING MAJOR PROBLEMS

Brown marmorated stink bug, *Halyomorpha halys*

The stink bug, and other members of the group Hemiptera, can be either predators of other invertebrates or herbivores. The brown marmorated stink bug (BMSB) feeds on plants, and has more than 170 known hosts. Some of my colleagues have commented that they haven't seen too many plants this insect won't eat. Species targeted by the bug run the gamut, from crop plants such as soybean, tomato, pepper and corn to orchard trees such as apple, peach, plum, cherry and pear, to commonly planted trees such as maple, dogwood, oak and elm.

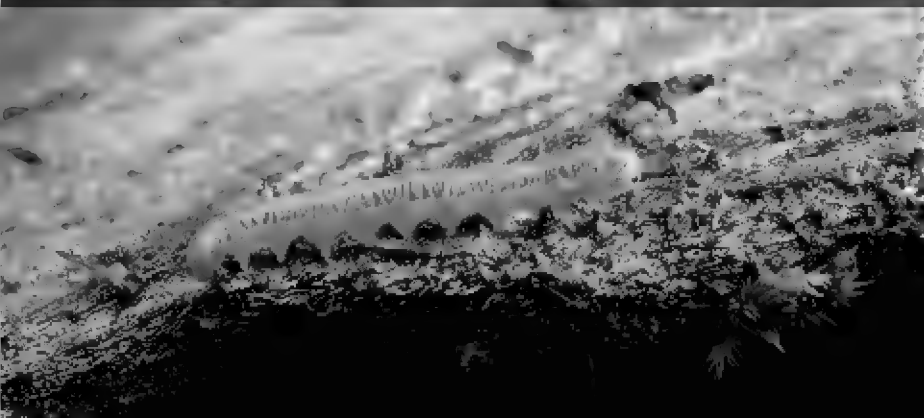
Native to China, Korea and Japan, BMSB was first detected in North America in 1998 in Allentown, Pennsylvania—another unwanted hitchhiker introduced through global trade. It arrived in Washington state in 2010. Both nymphs and adults feed on plants by piercing fruits and stems. Crop damage caused by this insect can be significant. For example, in 2010, it was estimated that Pennsylvania (the fourth-largest apple producer in the U.S.) lost 25 percent of its apple harvest due to BMSB, at a cost of roughly \$37 million. Washington agriculture is highly vulnerable to BMSB, since we are the top producer of several of its favorite plants, including apples, pears and hops.



In addition to damaging crops, BMSB is a notorious nuisance pest around the home. You can find numerous photos online of East Coast residents sweeping hundreds to thousands of stink bugs off their houses. The species overwinters in its adult stage, actively seeking warm places in which to pass the cooler months, such as outside and inside our homes. Adults grow to 5/8 inches long, have a mottled, grey-brown color, a shield-shaped body, and distinctive white bands on their antennae. Their feces can leave a nasty stain on walls and drapes, and—as their name implies—they exude a somewhat foul-smelling odor as a defensive mechanism. (Try not to squish them!)

Although we do not yet fully know the future economic and ecological costs of BMSB in Washington, we assume it will be high.

Green alder sawfly larva. Note the true legs near the head, and the prolegs extruding from the abdomen. (Photo by Christine Buhl, Oregon Department of Forestry/bugwood.org)



Green alder sawfly, *Monsoma pulveratum*

Like BMSB, the green alder sawfly is a fairly new arrival in Washington. As its name implies, it is green—and a bright, vibrant green at that. But only in its larval stage, when it looks very much like a caterpillar. However, the sawfly is not a moth or butterfly, but rather an insect in the order Hymenoptera, which includes ants, bees and wasps. Sawfly larvae can be distinguished from caterpillars by counting the number of false legs or “prolegs” on the abdomen—sawflies have six to nine pairs of these prolegs, while caterpillars have five pairs or fewer. Both sawfly larvae and caterpillars have three pairs of true legs each

attached to the thorax, just below the head; the prolegs are extensions of the exoskeleton and assist in locomotion. Adult green alder sawflies look like small wasps with black heads and black-and-orange striping, but they do not sting.

Native to Europe and North Africa, the green alder sawfly was first detected on our continent in eastern Canada in the 1990s. It arrived in Alaska in 2004, and then in Washington state in 2010. Not much is known about this insect to date. As with most invasive species, the green alder sawfly is a minor pest in its native environment. It passes the winter in a pre-pupal stage and emerges as an adult in early spring after completing pupal development. Adults mate, and females lay eggs on the leaves of suitable host plants—*Alnus* (alder) species. The larvae hatch and feed on the leaves with their chewing mouthparts.

In Alaska, green alder sawfly defoliated primarily thin-leaf alder (*Alnus incana*) in the southcentral part of the state, causing mortality—especially in concert with canker fungi. Because of the ecological importance of alder as a nitrogen-fixing plant and its role in riparian areas as a source of nitrogen for the soil, there are concerns about its potential loss. A study in Alaska showed that in some tree stands, up to 70 percent of the available nitrogen has its origin in alders, and that the rate of nitrogen fixation decreased by up to 73 percent following alder defoliation.

In Washington, many have a love-hate relationship with our native red alder (*Alnus rubra*). Some are highly allergic to the prolific amount of pollen it produces each spring; others view it as a less desirable tree in forested areas where Douglas-fir might be preferred. However, red alder does provide important ecological benefits by providing nitrogen to our soils. At present, we don’t know what level of damage the green alder sawfly will cause in Washington.

INVASIVE INSECTS LOOMING

Gypsy moth, *Lymantria dispar*

The presence of the gypsy moth in North America dates back to 1869, when the French astronomer Étienne Léopold Trouvelot (who





Gypsy moth larvae on Stockton Island, Wisconsin.
(Photo by Patrick Tobin)

RIGHT: Gypsy moth adult male (left) and female (right). They differ in color, size, and antennae shape. The male's feathery antennae contain chemoreceptor cells that can detect the sex pheromone released by female from several miles away.
(Photo by USDA APHIS PPQ/bugwood.org)



has craters on the moon and Mars named after him) brought gypsy moth eggs from Europe to his Massachusetts home in an attempt to find a replacement for producing silk. (At the time, silkworms were being detrimentally affected by a pathogen.) Not only did Trouvelot fail to succeed at making a profit (the gypsy moth larvae did not produce anywhere near enough silk to be economically viable), but he also allowed larvae to escape from his backyard following a heavy windstorm. The eventual result was an invasive species that has saddled the continent with more than 90 million acres of defoliation, and well over a billion dollars in management and damage costs.

Gypsy moths go through one generation per year. They overwinter as eggs, hatch in the spring, and—in larval form (the bristled caterpillars are dark colored with blue and red dots)—consume the foliage of more than 300 host plants. They have a special preference for oak, willow, birch, aspen, apple and larch. In early summer, the larvae enter a pupal stage, and a few weeks later emerge as adults to reproduce. The female adults (white with brown markings), which are loaded down with an average of 500 eggs and cannot fly, release a sex pheromone to attract a mate (male moths are dark brown). Once their eggs are fertilized, they lay them wherever they happen to be—on trees, shrubs, rocks, and homes and cars.

During outbreaks, trees are heavily defoliated, occasionally leading to tree mortality. High

numbers of caterpillars can also cause allergies, and they can be an extreme nuisance as they take over campgrounds and other recreational areas. Roads can become so slick with the bodies of dead and squished caterpillars that they are undrivable.

The gypsy moth is currently currently established from Minnesota to North Carolina to Maine. However, Washington has a long history of run-ins with this insect. Occasionally, male moths are caught in the state using traps baited with sex pheromone. Gypsy moth is an excellent hitchhiker, and we know that people have introduced it here after moving from the East Coast. Oregon had a well-known case of an accidental gypsy moth introduction when an Oregon resident purchased car parts on eBay from a seller in Connecticut. The parts arrived infested with gypsy moth eggs.

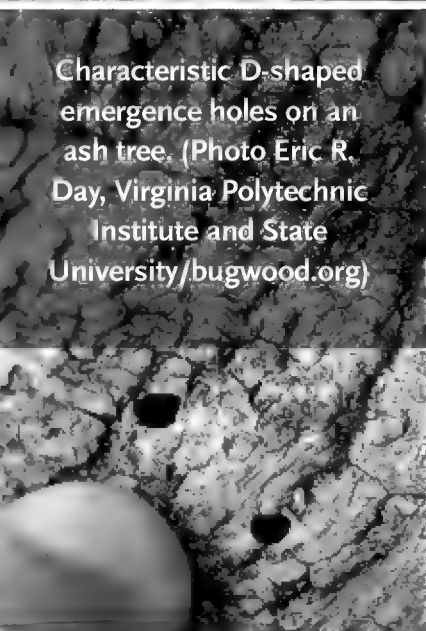
As Washington remains one of the faster-growing areas in the country, introductions will continue to occur, making it a priority to keep our state gypsy moth-free. Our Department of Agriculture traps locations around the state each year and aggressively targets gypsy moth populations for eradication, generally using a biopesticide call *Bacillus thuringiensis*. Although many people are understandably apprehensive about having their property or a nearby area sprayed for gypsy moth, studies have consistently shown that the negative effects from gypsy moth far outweigh the costs of using biopesticides.



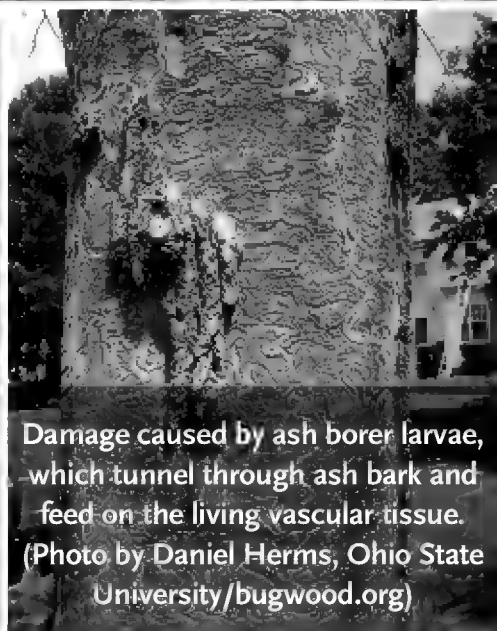
Adult emerald ash borer.
(Photo by David Cappaert/
bugwood.org)



Characteristic D-shaped
emergence holes on an
ash tree. (Photo Eric R.
Day, Virginia Polytechnic
Institute and State
University/bugwood.org)



Damage caused by ash borer larvae,
which tunnel through ash bark and
feed on the living vascular tissue.
(Photo by Daniel Herms, Ohio State
University/bugwood.org)



Emerald ash borer, *Agrilus planipennis*

Out of the small percentage of non-native species that become invasive is a much smaller subset of them that are so devastating they essentially cause the functional extinction of native species. The brown tree snake in Guam is one such example; it has caused numerous extinctions of birds and small mammals on the island. The non-native pathogen that causes chestnut blight functionally eliminated American chestnut (which was as dominant in eastern forests as Douglas-fir is in ours) in less than 40 years. Invasive insects that have this potential are fortunately very rare. The emerald ash borer (EAB) is one of them.

A bright, metallic green beetle species native to northeastern Asia, EAB was introduced to Michigan at least by 1996 and has spread rapidly. Its larvae develop inside wood, and it's believed the insect hitchhiked here on wooden packing material used in global trade. Females, after mating, lay eggs in ash trees, and the larvae feed under the bark, extracting resources from the trees' vascular tissues. The effect is deadly: Most trees lose their canopies within two years of infection and then quickly die. The estimated



number of ash trees that have already been killed by the EAB in North America is in the millions. All of our continent's native ash species (*Fraxinus*), as well as European species planted here, are susceptible to EAB, and the insect can attack and kill young ash trees even before the trees are reproductively viable.

Although ash is not a major component of Washington forests, they are commonly planted as street and garden trees here due to their aesthetically pleasing shapes. In many parts of EAB's invaded range, once-wooded neighborhoods have had nearly their entire complement of street trees wiped out. Imagine what 35th Avenue, from Wedgwood to Lake City, might look like in the absence of the flame ash that currently lines it. (Flame ash is a cultivar of narrow-leafed ash, *Fraxinus angustifolia* 'Raywood', which is native to Eurasia and is known to be highly vulnerable to the emerald ash borer.)

Currently, the emerald ash borer has invaded nearly all states east of the Mississippi River—and all states that border the Mississippi River to the west—and is found as far west as Boulder, Colorado. Like the gypsy moth, EAB is a good hitchhiker. It helped to inspire the nationwide "Don't Move Firewood" outreach campaign (www.dontmovefirewood.org). Although the Washington State Department of Agriculture views this insect as a high-priority target in early detection efforts, public vigilance would help in the fight to keep our state EAB free. Signs of declining ash trees—especially ones with epicormic branching (new shoots growing directly from trunk and main branch bark) and characteristic D-shaped exit holes (created by emerging adult borers)—should be reported to the Washington Invasive Species Council, www.invasivespecies.wa.gov. 🐛

PATRICK C. TOBIN is an insect ecologist and associate professor in the School of Environmental and Forest Sciences at the University of Washington. Among his research interests, he studies invasive species, plant-insect interactions, and the role of climate change on insect seasonality and distributional ranges.



Castor Aralia

BY DANIEL J. HINKLEY


An Adaptable, Bold-Foliaged Tree With Pollinator Appeal

One of the hardiest—yet decidedly most tropical-looking—deciduous trees in Washington Park Arboretum is the castor aralia, *Kalopanax septemlobus*. Native to northeastern Asia, it has a relatively long history of cultivation in North America, beginning in the late 19th century. (Boston's Arnold Arboretum promoted it as a hardy, bold-foliaged tree for the Northeast after then-director, Charles Sprague Sargent, first introduced it from Japan in 1892.) Nonetheless, the plant remains extremely rare in gardens of the Pacific Northwest.

The genus *Kalopanax* is monotypic, meaning that *K. septemlobus* (synonym *K. pictus*) is its lone species. As the common name suggests, the tree belongs in the Araliaceae, or aralia family, which features many plants that are familiar to Pacific Northwest gardeners. These include *Fatsia japonica*, numerous species of hardy *Schefflera*, our native devil's club (*Oplopanax horridus*), the fanciful lancewoods (*Pseudopanax*) from New Zealand and, of course, our curse, English ivy (*Hedera helix*).

Castor aralia is frequently encountered in the forests of northern Japan, Korea, China and the Russian Far East, where it is valued for its high-quality timber. Though the species typically grows between 40 to 60 feet in cultivation, in the wild, impressive specimens of 100 feet high and more can be found.

Often while traveling in South Korea, I have done double takes when seeing castor aralia from the corner of my eye, as it is a doppelganger of our native bigleaf maple, *Acer macrophyllum*. Its five- to seven-lobed leaves can extend up to 14 inches across, and in late October, the foliage's dark-green color will transition to the same somewhat muddy yellow as that of its Northwest look-alike.



The late-summer flowers of castor aralia.
(Photo courtesy Dalgial/Wikimedia Commons)

The stems are heavily, but handsomely, armed in spines, which are more prominent on younger wood. In Korea, the succulent new shoots of the tree are blanched and eaten as a spring delicacy, called *eumnamu-sun*. This practice should not come as a surprise to those who have been served the fresh, asparagus-like shoots of *Aralia cordata* in Japan or the fresh tips of *Aralia chinensis* in Vietnam and China.

In late summer, the tree comes alive with pollinators as its white flowers appear in broad, terminal umbels up to 20 inches wide. It was at the flowering stage in its cycle that I was first introduced to the species at the Arboretum, and I was astounded not only by the late arrival of the blossoms but also by how much they were coveted by bees and other insects. After successful pollination, the flowers develop into blue-black, two-seeded drupes that are highly attractive to a number of bird species in our region.

Castor aralia is very fast in growth. A seedling from my 2011 trip to the mountains of Guizhou,



The large, bold, maple-like foliage
(Photo by Niall Dunne)



The mature fruits
(Photo courtesy Ebben Nursery)

in central China, has already reached 20 feet. Interestingly—but not unexpectedly for a member of the Araliaceae—it has achieved this height without yet producing lateral branching.

The Arboretum’s lone specimen dates to 1952 and has grown into an impressive, multiple-trunk tree about 50 feet tall. It came to us as a young plant from the Arnold Arboretum, but the record is unclear as to the original provenance. Planted just south of Yew Hill, the specimen was a very “hidden treasure” until recently, when the construction of the Loop Trail made it easily accessible to Arboretum visitors. The tree now arches over the trail just to the north of the new plantings in the Viburnum Collection.

Castor aralia does best when planted in deep, moist, well-drained soil and full sun, but it can also tolerate wet conditions. Adaptability and popularity among birds may present a downside, however. Though the species has thus far appeared stable in regards to bio-invasion in our region, it has raised red flags in New England, where specimens have appeared in natural settings. More study of its potential invasiveness in the Pacific Northwest is needed before we can fully promote castor aralia as a worthy shade or specimen tree for regional gardens. ~



The Arboretum’s lone specimen, arching over
the Loop Trail
(Photo by Niall Dunne)

DANIEL J. HINKLEY is an ardent supporter of Washington Park Arboretum and a long-serving member of the “Bulletin” Editorial Board. He writes, lectures, consults and spends each autumn in remote areas looking for new additions for our gardens. He and his husband, Robert L. Jones, tend their personal garden, Windcliff, near Indianola, Washington.

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From Seattle to Denver My Long Horticultural Love Affair with the Specialty Nurseries of Puget Sound

BY PANAYOTI KELAIDIS

The populations of Denver and Seattle are very close in number: about 680 thousand for the former and 725 thousand for the latter. Both can lay claim to being the “biggest” cities in the West—if, that is, we quietly discount a few villages in California and Arizona. (Oh, and yes, if we hand Texas and its burgs whole hog over the South!) The parallels and differences between maritime Seattle and landlocked Denver—particularly in the arena of horticulture—are intriguing, perhaps even revelatory.

The differences are glaring enough, stemming from the fact that Seattle and Denver are sited in radically distinct ecoregions. But what of the parallels? Both Denver and Seattle have fostered a sizeable nursery industry, and both support some of the largest and most successful public gardens in the West. Intensive home gardening is a popular pastime for citizens in both cities, and the major plant societies—such as the bonsai, iris and cactus clubs—prosper in both places, and often host national meetings. The looming presences of Mount Rainier over Seattle and the Rockies over Denver have inspired large and active chapters of the North American Rock Garden Society (NARGS).

Few people have bothered to ponder the relationship—but I’ve spent a good deal of my professional life commuting (after a fashion) between these cities, and my personal odyssey may shed a glimmer of light on the rapidly evolving face of gardening and horticulture in both.



Steve Doonan at his and Phil Pearson’s
Grand Ridge nursery, Issaquah.



The iris collection of Renton-based Carla and George
Lankow, now growing at Denver Botanic Gardens.

It's a story of legendary nurseries and plant folk; of friendships, gifts, and exchanges; and of mutual adoration of the goddess Flora.

The Start of the Affair

I first visited the Pacific Northwest in July of 1976, when NARGS and its British Columbia cousin co-sponsored an "Interim International Rock Plant Conference." The conference convened at the University of Washington campus, and I well remember the pink cone of Mount Rainier as I drove to and from my motel for the talks. (I'd signed up late and didn't get into the dorms!)

Somewhere in my files, I probably still have the program and a list of participants (there were many hundreds). The talks were copious and diverse, and most of them were given by keen gardeners from the Pacific Northwest. I was especially anxious to hear Roy Davidson, whose many writings on penstemons and native iris I'd read and admired. The conference also included field trips to home gardens and an unforgettable bus trip to Paradise at Mount Rainier National Park, which was my first exposure to the Cascade alpine flora.

There had never been an event of this scope and ambition in NARGS before, and it demonstrated the extraordinary depth and breadth of talent in growing native and alpine plants that existed in the Seattle area so many years ago.

Caperci's and the Plant Farm

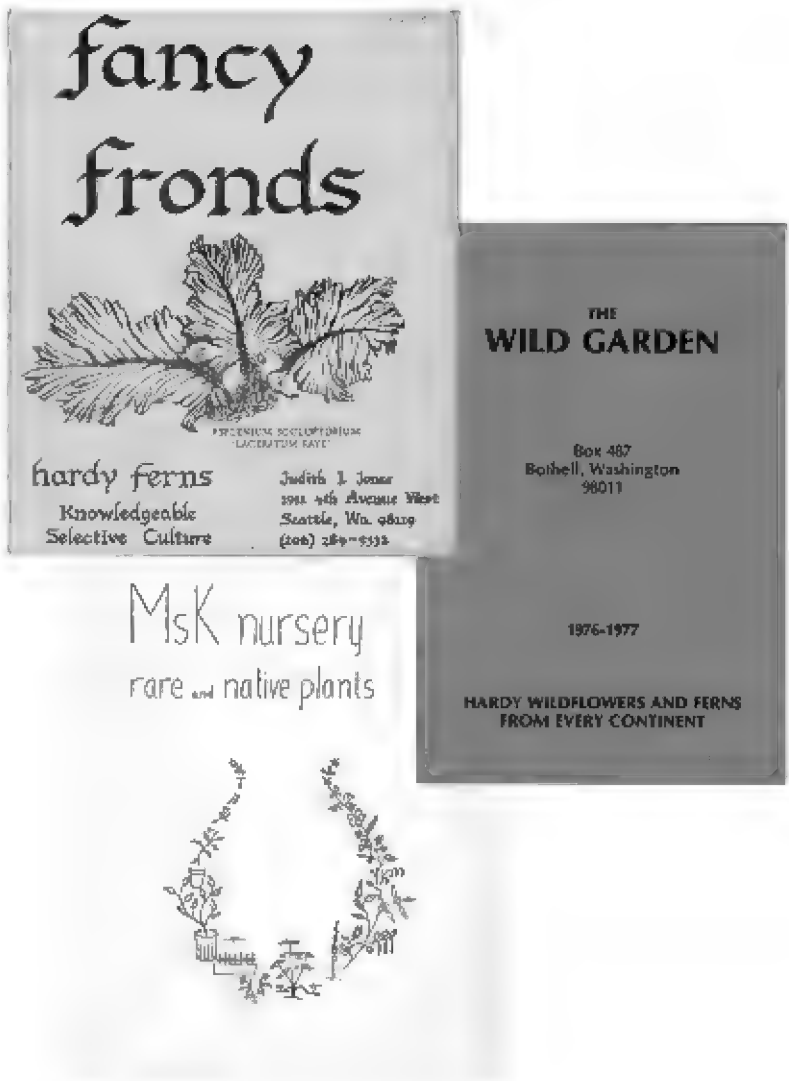
Long before Heronswood and Far Reaches Farm, the Puget Sound region boasted a tremendous number of specialty nurseries—most specializing in conifers, rhododendrons, native plants, alpiners and rock gardens. I took time during my first visit to go to as many of these as I could.

There was Caperci Nursery in Bellevue (profiled in the summer 1982 "Arboretum Bulletin"), which had a fantastic range of rhododendrons and dwarf conifers. I still remember the hours I spent with Jim and Betty, and I still grow a husky, prostrate Japanese willow (*Salix yezoalpina*, now classed as a subspecies of *S. nakamuraana*) I found there—a little trophy and

remembrance of that visit decades ago. (Aren't all of our gardens like this? Full of talismans and ties that weave together the fabric of our lives!)

The Plant Farm, in Kirkland, owned by Bob Putnam, was unquestionably the best alpine nursery of the time (along with Siskiyou Rare Plants in Medford, Oregon, I hasten to add). It became my Mecca! After my first visit, I would drive, or fly up to Putnam's for years to buy plants. Indeed, these plants formed a significant core of the collections that populated the new Rock Alpine Garden at Denver Botanic Garden (DBG)—which I was to oversee, starting in 1980. We still grow tremendous numbers of treasures from the Plant Farm, but one taxon effectively changed my professional life forever!

During one of my visits, Bob insisted on adding a mysterious South African succulent labeled "Mesembryanthemum sp. Basutoland" to my order. "I think this will do well for you," Bob counseled. I was dubious that any South African plant would grow in Denver, let alone a succulent, but I dutifully planted it.



The Miller Library keeps an archive of catalogs from specialty nurseries in the Puget Sound region.



Hardy yellow ice plant growing in the Steppe Garden at DGB. Bob Putnam's gift of the plant inspired our research program on South African flora.

The plant's odd name turned out to be a synonym for *Delosperma nubigenum*—the hardy yellow ice plant. And the success of the succulent in cultivation inspired me to research other ice plants (DBG has succeeded in overwintering well over 100 taxa to date), as well as other South African genera. It has also led to my traveling to South Africa six times, thus far, and generated many more trips by nearly a dozen of my colleagues—many of whom have pursued collaborations and relationships in southern African countries.

And incidentally, Denver Botanic Gardens has not one, but two gardens featuring South African plants. This example shows how a single act—the exchange of a plant—can have enormous impact. Were he alive today, Bob Putnam would, I suspect, be astonished at the consequences of his gesture. Such is the power of a gift of a plant!

The example may be extreme, but each act of gardening can, in its own way, have revolutionary and revelatory consequences. We all know how frustrating it is to plant a rapidly running plant, or one that seeds a tad too much, and then deal with the challenge of reining it in. Scaremongers

would make us fear to garden. But every plant that “works” often inspires the gardener or a garden visitor in multifarious ways—from the thrill of aesthetic bliss in the moment, to a desire to learn and study and take on some great challenges you might never have otherwise considered. I sincerely believe the overwhelming bulk of gardeners aren't just ethical but moral magicians who help bridge the widening gap between human “civilization” and the natural world...but I'm waxing too philosophical. Let's get back to the main story.

The Wild Garden, MsK Nursery and Grand Ridge

Another Puget Sound nursery I visited on my first trip was George Schenk's Wild Garden in Bothell. I treasured the small sheaf of catalogs George produced and ordered dozens of things from him. At the time, I think the Wild Garden had the cache of being the “coolest” mail-order nursery in America: So many plants in it were unique, and George's colorful prose style was inspiring.

For example, back then the Wild Garden was the only mail-order source for *Epimedium*, and I got many of my first unusual species from George. I also obtained the giant form of *Synthyris missurica* from him—starting a love affair with that whole genus. In fact, I still grow dozens of plants that I first bought from the Wild Garden half a century ago.

As a mail-order-only operation, George's nursery wasn't open to the public; but by a wonderful fluke of luck, I had a chance to visit it and meet George—a memory I shall always cherish.

And there was MsK Nursery (profiled in the Winter 2016 “Arboretum Bulletin”), which almost exclusively featured—and still does—native northwestern trees, shrubs and wildflowers. MsK was run by Mareen Kruckeberg, wife of the redoubtable and extraordinary force of nature Arthur Kruckeberg. Everyone knew and loved Art, a professor of botany and ecology at the University of Washington, but fewer knew his amazing, diligent and quiet wife. I visited MsK many times in subsequent years, and numerous plants still growing in Denver came from there. These include the California endemic, *Cupressus*

macnabiana, a fantastic hardy cypress that spurred us to test more members of the genus at DBG. Thanks to Mareen, both MacNab cypress and Baker cypress (*C. bakeri*), a rare tree from the Siskiyou, are treasured landscape plants in the gardens of sophisticates in Denver.

The most eclectic and exciting nursery for me at that time was Grand Ridge, in Issaquah, where Steve Doonan and Phil Pearson had amassed an enormous collection of rare alpine—both native and exotic. Steve and Phil’s “bread and butter” came from their garden maintenance business, but Grand Ridge was a sort of sacred precinct where all manner of choice alpine and woodlanders were grown to immense size and staged in gorgeous stoneware tossed by Phil.

I’ve never seen a public garden in North America with an alpine collection that could compare to what “the boys” produced. Soon after I started my job at DBG, in 1980, I received a large box full of perfectly packed (and unsolicited) alpine treasures. It was the first and only gift of its kind I got that spring, and I shall never forget it!

A Two-Way Street

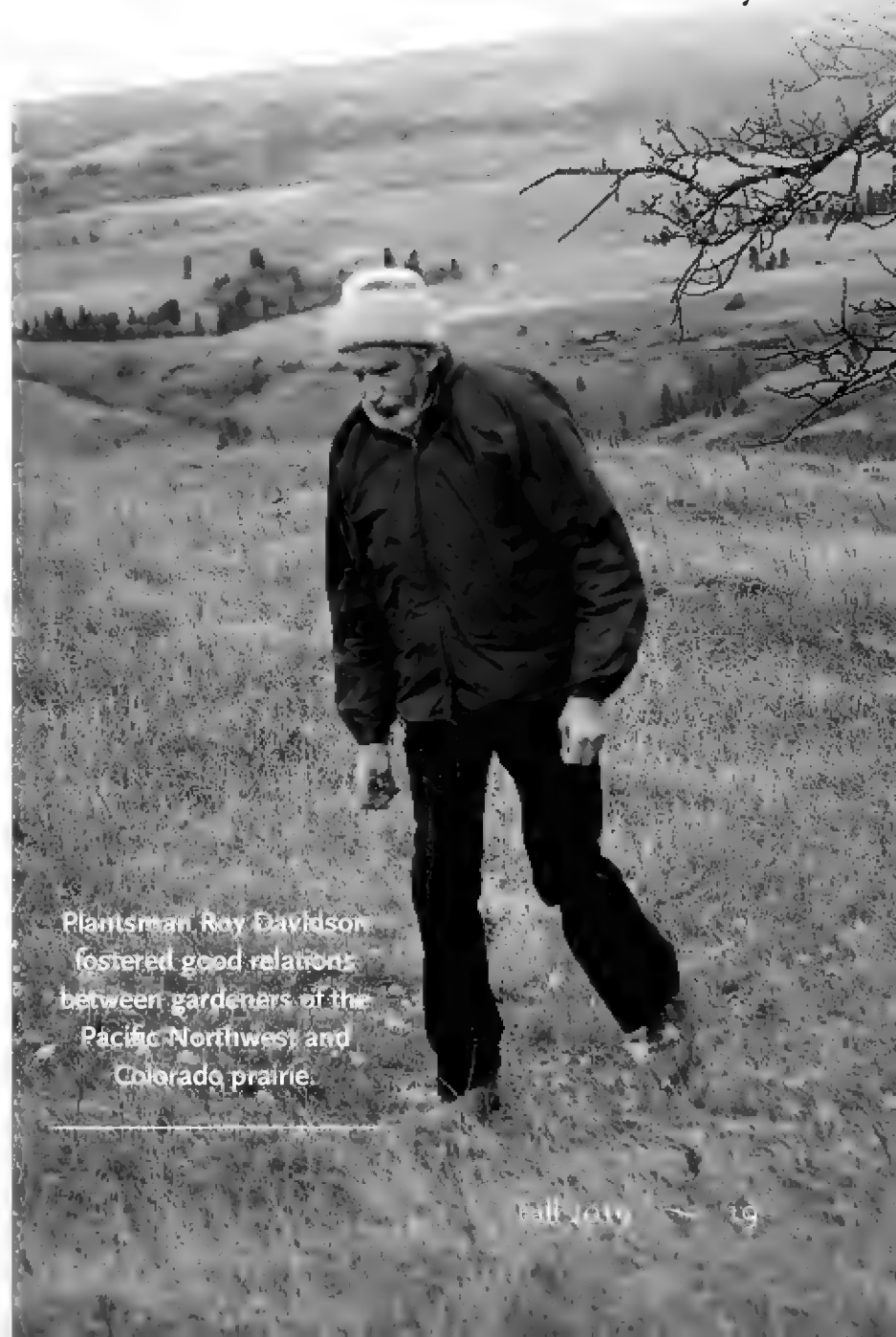
These Puget Sound gems, and many others around the state—including the Chehalis Rare Plant Nursery, Lamb’s Nursery in Spokane, and Thurman’s Gardens just outside Spokane—were perhaps the biggest and best repositories of diverse and unusual perennials, native plants, trees and shrubs anywhere in the United States in post-mid-century America. I made pilgrimages to all of them, and their owners and staff became friends and mentors to me and others in our region.

But was the relationship between Washington and Colorado one-sided? Not entirely. Shortly after meeting Roy Davidson in 1976, he decided to pay me a visit. He’d always wanted to see the southern Rocky Mountain flora, and I provided a welcome home for that end. Over the next few decades, Roy showed up invariably in late summer or fall, after helping with the pea harvest at his family ranch, and we’d take field trips around Colorado, visiting gardens and nurseries. His jeep would go back to Washington laden with goodies and ideas. He’d sometimes show up in the

spring as well, or if there were any conferences going on. Several times, after a lull of months, I’d find him busily sweeping clean the floor of the Alpine House at Denver Botanic Gardens (DBG) or tactfully straightening its labels.

Roy inspired many of his Seattle friends to check us out as well. I remember Marvin Black—City Forester of Seattle and plant guru extraordinaire—calling me up and suggesting strongly that I invite him to speak in Colorado. This led to him being the banquet speaker for our rock garden club one winter. (Roy found out about it and even flew down to surprise and heckle Marvin.) Art Kruckeberg likewise twisted my arm for a presentation in exchange for room and board and a chance to look around. I was glad to oblige.

In 1986, our Colorado rock gardeners staged the second Interim International Rock Garden Conference—the largest such gathering to ever take place, with over 500 participants and 200 volunteers. Of course, this was very much inspired by and modeled on the first conference in Seattle and Vancouver. I recall that the largest and most enthusiastic block of attendees—many



Plantsman Roy Davidson fostered good relations between gardeners of the Pacific Northwest and Colorado prairie.



Kelly Dodson, Sue Milliken and Dan Post
of Far Reaches Farm touring DBG

dozens—came from the Pacific Northwest, predominantly from the Puget Sound area. Hardly an accident at this point.

Over the decades, this back and forth continued, and it even gave birth to an informal exchange of interns. (Mike Kintgen, the DBG's outstanding Curator of Alpines, interned for a summer at the Rhododendron Species Foundation, and many Washingtonians have helped us at DBG.) Many new players on both sides have expanded our initial collaboration.

Recent Exchanges: The Lankows, Heronswood and More

About 10 years ago, I got a call from Pacific Northwest garden guru Jim Fox inquiring if DBG might consider accepting the large collection of historic, species and special irises that Renton-based Carla and George Lankow had accumulated over a lifetime of keen study. After a substantial period of negotiation, deliberation and debate, an enthusiastic team of DBG staff and volunteers undertook to provide space, documentation and maintenance for nearly 400 taxa of irises. The Lankow collection has become an extremely successful centerpiece at Denver Botanic Gardens' 700-acre Chatfield Farms site. It's yet another example of the powerful cross-pollination of our regional horticultures—not to mention a physical manifestation of the years that Jean Witt (wife of the Arboretum's legendary curator Joe Witt) and Roy Davidson spent mentoring me and others on iris matters from afar.

Judith Jones of Fancy Fronds Nursery and Sue Olsen, who founded the Hardy Fern Foundation, have been the two most influential forces expanding awareness and the palette of hardy ferns in America. Denver Botanic Gardens has participated in the Hardy Fern Foundation's test and display program for many decades.

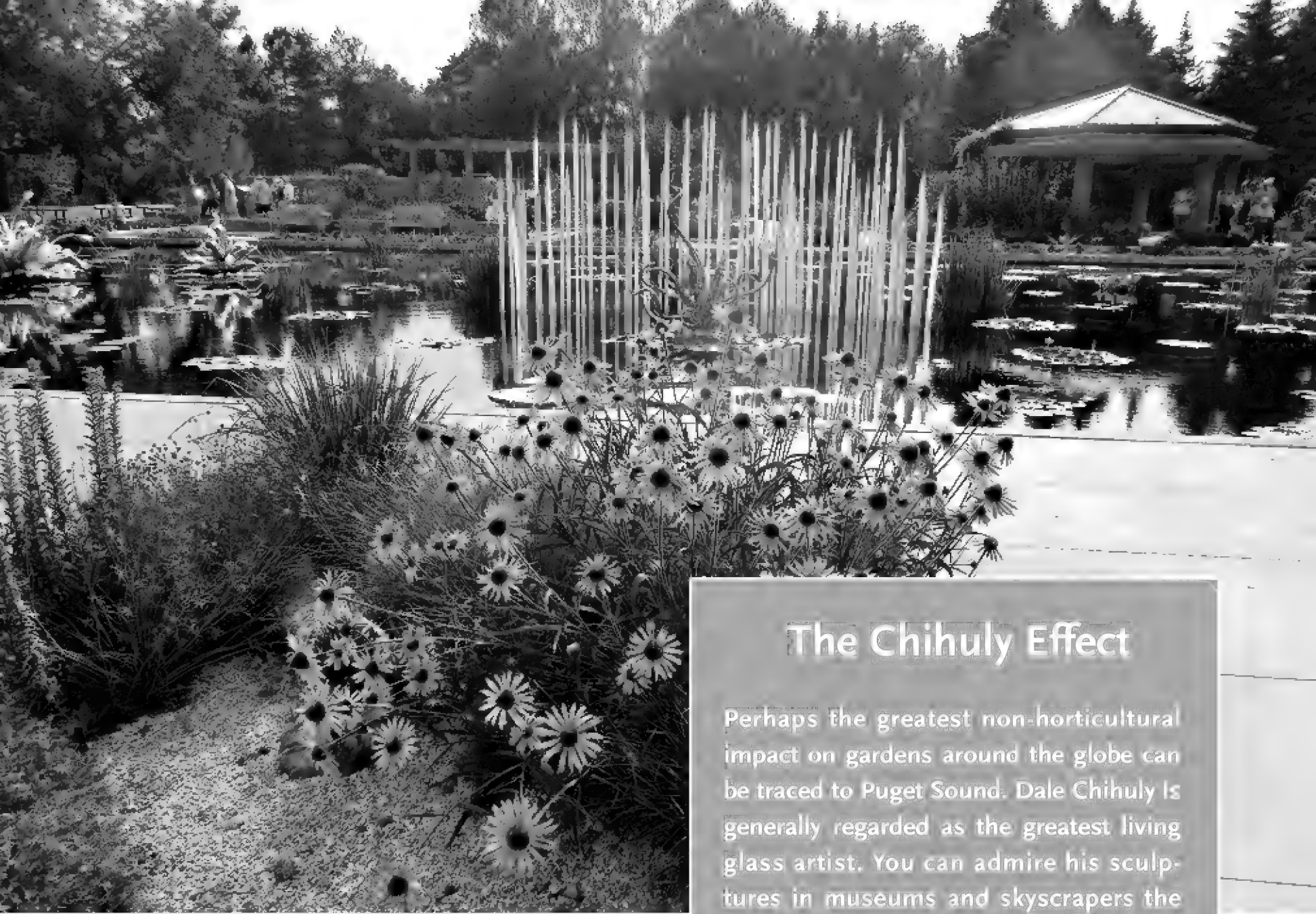
In the last decades of the 20th Century, the startling appearance of Heronswood Nursery revolutionized garden palettes across America. This was the "go-to" nursery of its time. Dan Hinkley opened up a vast new selection of choice perennials and shrubs, many from his own wild collections from East Asia (and everywhere else). Who hasn't been charmed by Dan's charismatic, artistic, and delightfully humorous presentations. He electrified Colorado audiences again and again when he presented at the perennial "Horticulture Magazine" symposia at DBG.

While not as well known, Rick Lupp made Mount Tahoma Nursery the choice place for choice alpines for several decades. Perhaps Rick's greatest legacy is introducing a wide suite of *Daphne* species and hybrids (many his own crosses) that have become extremely popular landscape evergreens in our region. I am sure that the great bulk of *Daphne* taxa in America (100 or more) today trace mostly to Rick. His is a huge contribution that has never been properly acknowledged.

Kelly Dodson and Sue Milliken of Far Reaches Farm today are providing the widest spectrum of choice perennials, shrubs and trees I know of in America. They've visited Denver on several occasions, and they've been generous donors of plants to Denver Botanic Gardens—yet more cross-pollination!

Most recently, Dave Olszyk (the dynamic Tacoma-based President of the American Conifer Society) has taken an interest in Denver, flying out and coaxing our fledgling conifer group to host a successful regional meeting. On another occasion, Dave flew out to dedicate our DBG's Conifer Berm as an official ACS display garden.

I shall never forget being invited by Elisabeth Miller to give her namesake lecture nearly 35 years ago. One of the great influencers of Puget



Sound horticulture, she overwhelmed me with her expansive personality and other disarming eccentricities. I was also enchanted with her private home, which has since become the headquarters of the Miller Botanical Garden and was the reason for my most recent visit to Seattle last year (and ultimately for this article). The ping-pong diplomacy goes on.

Speaking on behalf of Rocky Mountain horticulture, we owe an enormous debt to the rich tradition of gardening around the Puget Sound. I hope that I've acknowledged herein a few of the hobbyists and professionals from your region who have inspired me personally, and those who've mentored me over the decades. I apologize for the omission of the dozens of names I could, might and probably should also have included.

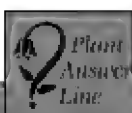
As for the debt that Seattle owes to the Rocky Mountains? I hope perhaps one day some of your plants people can limn that theme in detail. They mustn't forget their sunscreen, hats and parkas, but they may leave their umbrellas at home.

The Chihuly Effect

Perhaps the greatest non-horticultural impact on gardens around the globe can be traced to Puget Sound. Dale Chihuly is generally regarded as the greatest living glass artist. You can admire his sculptures in museums and skyscrapers the world over, but public gardens that host outdoor Chihuly installations experience enormous benefits. Denver Botanic Gardens is not unique in having practically doubled admissions the year that we hosted Chihuly. In fact, that year (2014) DBG had the largest visitation numbers of any public garden in North America.

The boost in revenue and membership far exceeded our optimistic projections. Most significantly, the expected drop-off in visitation the following year never materialized. The "Chihuly effect" was long lasting. Dozens of botanic gardens around the world have staged Chihuly art and had similar results. The benefits that have accrued by these institutions are truly incalculable: one more reason to be grateful to Puget Sound artistry! ~

PANAYOTI KELAIDIS is the senior curator and director of outreach at Denver Botanic Gardens.



Q&A from the Miller Library's Plant Answer Line

ANSWERS TO BATTY QUESTIONS

BY REBECCA ALEXANDER

This regular column features Q&A selected and adapted from the Elisabeth C. Miller Library's Plant Answer Line program. If you'd like to ask a plant or gardening question of your own, please call (206) 897-5268 (UW Plant), send it via the library website (www.millerlibrary.org), or email directly to hortlib@uw.edu.

Bat house.
(Photo by
Mark Buckawicka/
Wikimedia
Commons)



Our native western
long-eared bat.
(Photo by Lassen
National Park
Service/Wikimedia
Commons)



Evening primrose.
(Photo courtesy
Christian Ferrer/
Wikimedia
Commons.)



QUESTION: Are there plants I can grow that will attract bats? And, just for fun, are there plants that are bat-like in appearance?

ANSWER: It is wonderful that you are trying to welcome bats into your garden. They are important pollinators and dispersers of seeds. In our state, all species of bat are protected wildlife—and some are in trouble. The non-profit conservation organization Bats Northwest (www.batsnorthwest.org) says that nine of our state's bats are "species of special concern." To help local bats, they recommend that homeowners provide roost sites, such as hollow trees and bat houses, maintain their gardens without using pesticides, and grow plants to attract night-flying insects that bats like to eat. These plants include:

- *Hesperis matronalis* (sweet rocket)
- *Ipomoea alba* (moonflower)
- *Matthiola longipetala* ssp. *bicornis* (evening-scented stock)
- *Mentha spicata* (spearmint)
- *Mirabilis jalapa* (four o'clock)

- *Nicotiana glauca* (jasmine tobacco)
- *Oenothera biennis* (common evening primrose)
- *Phlox* species (phlox)
- *Salvia* species (sage)
- *Silene noctiflora* (night-flowering catchfly)
- *Silene nutans* (Nottingham catchfly)
- *Solidago* species (goldenrod)

The Washington Department of Fish and Wildlife has information on purchasing bat houses or building your own (<https://wdfw.wa.gov/species-habitats/living/species-facts/bats>). More information can also be found on the Bat Conservation International website, www.batcon.org.

The British Bat Conservation Trust (www.bats.org.uk) suggests that you leave some wild areas in the garden, add a pond if you can (as a place for bats to forage for insects and drink), and plant night-scented flowers. Plant diversity seems to be the key: Try growing flowers of different shapes, sizes, and fragrances, as well as plants with pale, single flowers and flowers that

are good “landing platforms” for insects, such as those in the daisy and carrot families.

A few caveats: If you find a bat (or any other wild mammal) that appears to be ill, injured or docile, do not attempt to handle it, as it may have rabies. (Five to 10 percent of sick, injured or dead bats tested by the Washington State Health Department have rabies; however, the Department estimates that less than one percent of the native wild bat population has rabies.) It is best to call an agency such as Animal Control or PAWS Wildlife Center. Also, do not handle bat droppings, which may contain *Histoplasma* fungal spores that you should avoid inhaling (see below).

A number of plants bear flowers that resemble bats. Here are a few suggestions:

- *Cuphea llavea* (bat-faced cuphea): subshrub native to deserts of Mexico with red and purple flowers; grown as an annual here.
- *Tacca chantrieri* (black bat flower): tropical plant from Southeast Asia with black-purple flowers.
- *Dracula* species: orchids from South and Central America that look like the blood-sucking count in his winged-mammal form.

Should you wish to extend the theme, say for Halloween, other “spooky” plants include ghost plant (*Monotropa uniflora*), eyeball plant (*Acmella oleracea*), and corpse flower (*Amorphophallus titanum*).

My local nursery is selling bags of bat guano, and enriched compost that includes it. What is bat guano good for, and is it safe to use? The company describes all their products as organic.

No matter what is in your compost, it is always a good idea to wear a dust mask when opening bags of soil amendments, and when spreading them in the garden. A mask will help protect you from breathing in airborne fungal spores.

Bat guano is used as a fertilizer, and provides supplemental nitrogen, according to Oregon State University’s Extension Service. It contains about 12 percent nitrogen. The ratio of N-P-K (nitrogen-phosphorus-potassium) is approximately 8-5-1.5.

A recent news story on National Public Radio highlighted the human health risks of exposure to bat waste (guano) in caves in Borneo. Both world travelers visiting bat caves and local harvesters of guano may be at risk of contracting very serious viruses, unless they take precautions (masks, gloves and scrupulous hygiene). In parts of the United States (particularly the Ohio and Mississippi River valleys), there is a fungus called *Histoplasma* that is found in soil containing bat or bird droppings. Gardeners who wear masks when digging in affected areas can avoid contracting the disease histoplasmosis.

The U.S. Department of Agriculture allows the use of bat and bird guano as soil amendments “with restrictions.” The guano must be decomposed and dried according to USDA organic regulations for raw manure. I recommend contacting the manufacturer of the products at your nursery and asking them where they obtain their bat guano and whether they meet NOP (National Organic Program) and OMRI (Organic Materials Review Institute) standards. You can also ask about their veterinary and phytosanitary certificates for these products, and whether they make certain the guano is harvested sustainably and without harm to the bats and their ecosystem—or to the health of harvesters (particularly in countries without strong worker protection laws).

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REBECCA ALEXANDER is the manager of Reference and Technical Services at the Miller Library, located in the UW Botanic Gardens’ Center for Urban Horticulture (3501 NE 41st Street, Seattle). She is also a contributing editor to the “Bulletin.”



Watercolor and block print exhibit by Molly Hashimoto.

MILLER LIBRARY EXHIBITS

Complementing Gardening Books with Botanical Art

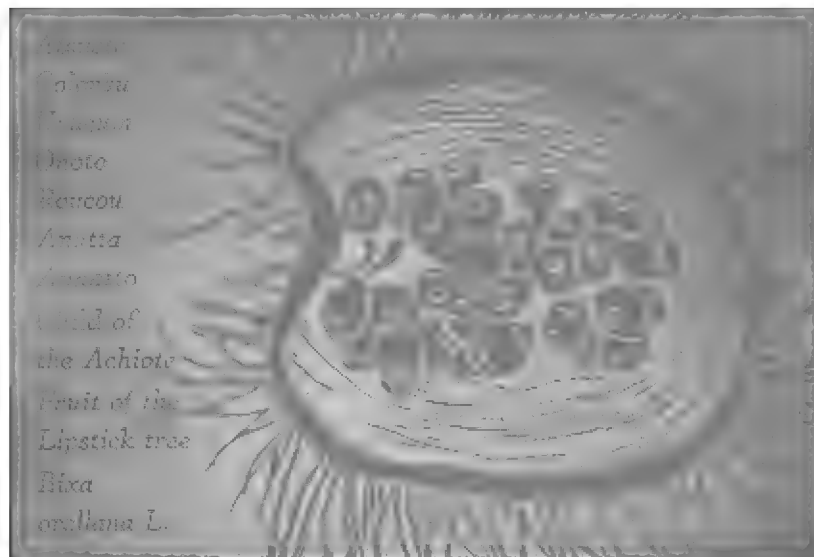
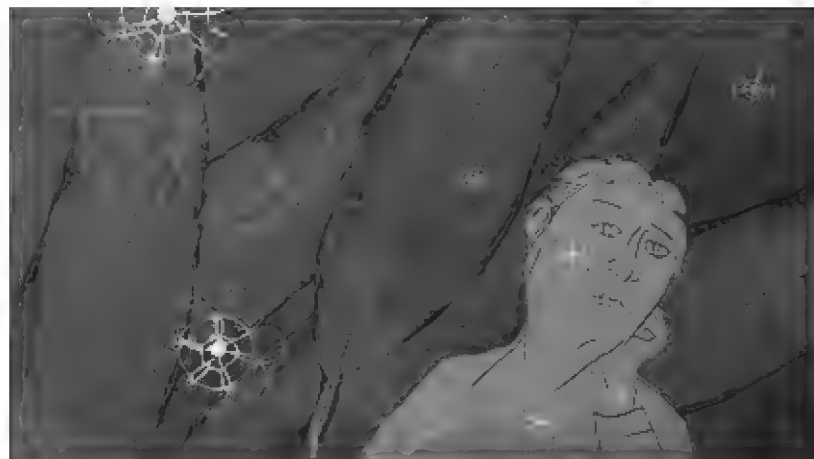
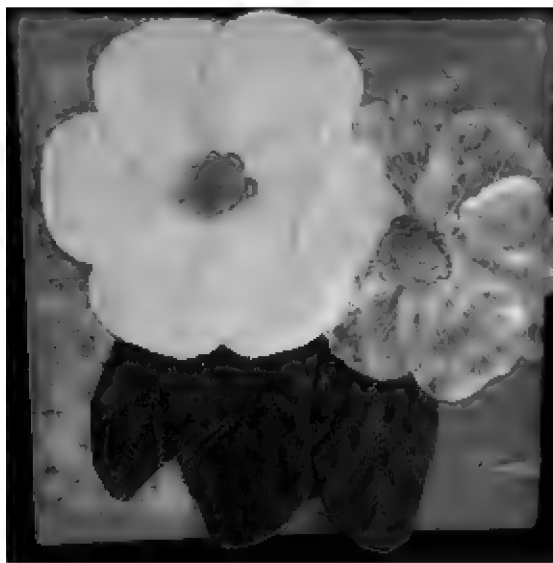
Not long after the Elisabeth C. Miller Library settled into its new building in 2005, we began hosting art exhibits on an occasional basis. Many of the early exhibitors were known to us already, through their connection to the Library, the University of Washington Botanic Gardens, or the local horticulture community. Suzanne Ferris and Neal Bonham (an Arboretum gardener who co-ran Sea Pen Press) displayed handmade paper, paper-beating mallets from Japan, and Suzanne's paintings of *Broussonetia papyrifera* and *Edgeworthia*, two plants used in making paper. Garden volunteer Larry Howard displayed photographs of the planting beds here at the Center for Urban Horticulture, and staff gardener Stephanie Jeter showed her photos taken at the Washington Park Arboretum.

As we built a reputation for holding exhibits, artists began to seek us out, hoping to show their work. We soon realized the need to create a written policy on art in the library, with a timeline to help exhibitors plan ahead. Our current policy explains the subject scope of what we show (horticultural and botanical interest, depictions of plants or gardens, or works using plant-based materials), and we ask that artists donate 25 percent of the proceeds from any sales to the

library. Since the library's space was not designed as a gallery, we limit the areas where art may be displayed. That said, there have been innovative uses of the space—such as large quilts with botanical themes hung from the exposed beams, a giant three-dimensional model of slime mold sporangia suspended high on a wall, and static decals of slime mold on the library's glass doors.

Early on, we began to curate exhibits, inviting artists whose work was of particular interest and appeal. The first of these I recall was artist and librarian Jenny Craig, whose “vegetable papyrus” (thin lateral slices of vegetables and fruit displayed between plates of glass) offer “a window into the internal structure of the object.” She also makes plant-dyed paper with letterpress text.

Many artists have shown here more than once. Since 2008, the Pacific Northwest Botanical Artists, a chapter of the American Society of Botanical Artists, has held a group show here each April to coincide with the library's annual book sale. Watercolorist and printmaker Molly Hashimoto has continued to show her vibrant landscapes and portraits of the natural world (birds and other wildlife, trees and flowers) since her first exhibit in 2011. Each May, students from UW's School of Environmental and Forest



Sciences create posters to showcase their scientific research, and each December we hold an arts and crafts display featuring everything from botanically decorated pottery, tea towels, and homegrown herbal salves to plant-and-nature-themed calendars and cards, and “wetlands in a bottle.”

Lou Cabeen’s recent show, “Botanizing Hope,” featured stitched pages from a “herbarium of the Anthropocene,” depicting plants used in phytoremediation. In the show “Fabricated Foliage,” Kaylin Francis created three-dimensional textile portraits of unusual plants such as *Diphylleia grayi* (skeleton flower, whose transparent petals the artist evoked very effectively), and *Rafflesia arnoldii* (a malodorous parasitic plant). Librarian, poet, and visual artist Carletta Carrington Wilson’s June 2019 show “field notes” featured mixed-media collages that reflect upon the legacy of slavery in American agriculture, and the alternate means of communication slaves in the fields used because reading, writing, and “unlawful assembly” were forbidden. Upcoming shows include work by botanical artist Linda Vorobik in October and a new exhibit by Molly Hashimoto in November.

Much of the work we show is in familiar media such as painting, drawing, printmaking, photography and sculpture. An unusual recent exhibit of animation by Rachel Lodge seamlessly incorporated art and science in a visual exploration of the carbon cycle, with framed stills of her animation and a running display of video. This particular show drew college art classes and high school horticulture students into the library. That is one of the goals of our exhibits: to broaden awareness in the larger community of what the library has to offer. Another goal is, of course, to provide enrichment to library

visitors who come for the books, journals and reference services and are pleasantly surprised to discover that we now regularly display art as well.

We host exhibits most months of the year, and now—when the walls and shelf tops are cleared—library visitors often ask when the next show will open, commenting that “it looks so bare” in that brief interim. Most librarians, readers and bibliophiles already find pleasure in the promised joy that the sight of thousands of spines on shelves inspires, but it is certainly true that exhibits complement the atmosphere, drawing readers and researchers to the art and attracting new audiences who will also discover the library’s resources. ~

REBECCA ALEXANDER

Adapted from an article that originally appeared in the March 2019 issue of “The Botanical Artist.”

TOP LEFT: A depiction of sunflower roots, by Lou Cabeen.

TOP MIDDLE: Textile portrait of a skeleton flower, by Kaylin Francis.

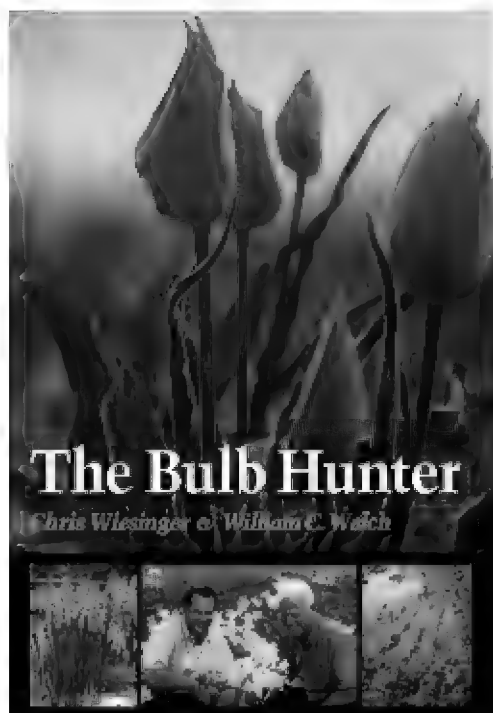
TOP RIGHT: “Awake,” with willow leaves, from Rachel Lodge’s carbon cycle series.

BOTTOM RIGHT: Letterpress print of an achiote fruit by Jenny Craig.

TREASURE HUNT

New books on botanical exploration

BY BRIAN R. THOMPSON



Bulb Hunter

At an early age, I received a birthday present of a dozen gladiolus corms. The results—plants taller than I was, with brilliant colors—were enthralling and made me a life-long bulb (more accurately: geophyte) enthusiast. For author Chris Wiesinger, it started with just a single bulb. He planted “his little rock” in his California Central Valley home and forgot about it. The next spring “something magical had occurred; my living rock had turned into the most striking red tulip.”

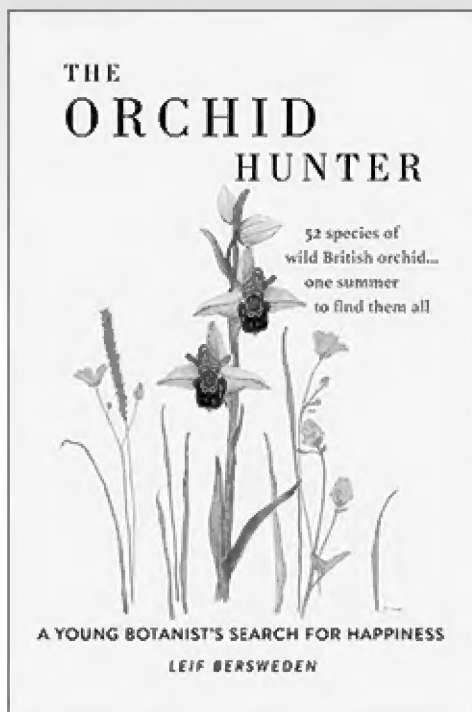
Sadly, this was a one-and-done experience. The next year, only leaves appeared. A year later, he dug down to find the remains of a rotted bulb. But the experience had lit a spark. Indeed, for Wiesinger, it gave rise to a combination of consuming passion and—later in life—business. He tells his story in “The Bulb Hunter,” co-written by William Welch, a veteran horticulturist and Wiesinger’s mentor at Texas A&M.

Wiesinger was only a temporary Californian. He returned to his Southern roots in Louisiana, and then Texas, searching for bulbs that had long out-survived the demise of the houses they surrounded. These included the elusive, perennial red tulip (*Tulipa praecox*), found only in gritty black clay that’s so hard it bends shovels. The gritty soil matches that of the tulip’s central Asian homeland and allows for drying out in the summer while also protecting the bulb from its natural enemies—gophers and voles.

Wiesinger began growing and sharing the “lost” bulbs he found. Eventually he developed his own mail-order nursery, the Southern Bulb Company, to propagate and sell these rare species and heirlooms.

We hear the tales of many of these plant survivors in the first half of “The Bulb Hunter;” the second half of the book is co-author Welch’s story. His is more a typical garden memoir, recounting the bulbs and companion plants that thrive in Texas and the Gulf South in each season. While it is a stretch to use this information as guidance for Pacific Northwest gardening, some interesting possibilities present themselves, and I’m looking forward to trying them.

I was pleased that gladiolus species are prominent in both halves of the book. *Gladiolus byzantinus* (syn. *G. communis* var. *byzantinus*) is found in old cottage-style gardens, and Wiesinger considers it one of the most valuable bulbs he sells. Unfortunately, it is also a favorite of gophers and voles. The challenges of thwarting these “glad lovers” will amuse every gardener.



Orchid Hunter

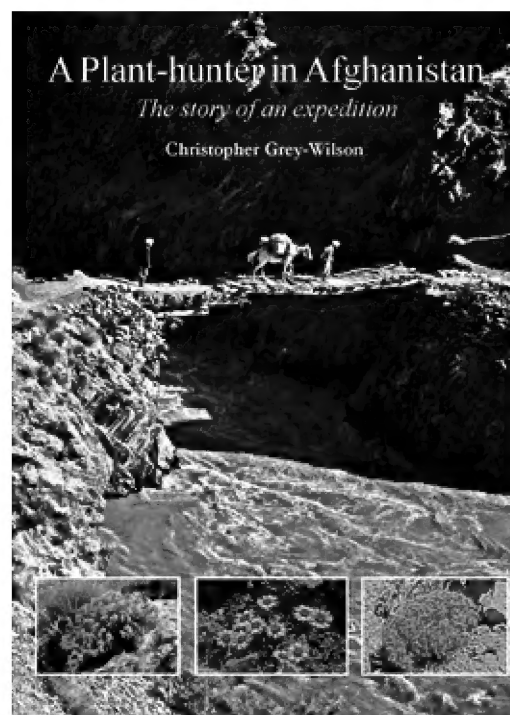
When young students take a gap year between college and graduate school, they often travel abroad to explore distant lands, perhaps donate their time to a devoted cause, or learn a different culture. Very few spend the time botanizing. This is what makes Leif Bersweden's story so interesting. At age seven, he found his first orchid: "Mum, this flower looks just like a bee." From this simple beginning, a passion grew, and he decided to spend his gap year tracking down and photographing all 52 native species of Orchidaceae in Britain and Ireland. He relates his story in "The Orchid Hunter: A Young Botanist's Search for Happiness."

His was no small task. In general, the orchids of Britain and Ireland are not showy, except up close, and easily hide amongst other vegetation. Some are extremely rare. Most are located well off beaten pathways, difficult to reach with Bersweden's car, which was prone to breaking down. (Actually two cars, as the first one did not last the full year.) Meanwhile, our young botanist was growing up and undergoing many of the usual coming-of-age emotional upheavals.

Other than the botanical theme, why am I recommending this book? Because Bersweden is an excellent storyteller. In addition to his personal challenges and triumphs, he is adept at telling the history of British and Irish botany and related studies of wildflowers. Best of all, you—the reader—get caught up in the chase! Will he succeed in finding all 52 native orchids, despite

a late spring, a hot summer, the challenges of driving 10 thousand miles on often-minimal roads, and some iffy accommodations? (Spoiler alert!) Happily, he does.

And happily for the reader, he never loses his sense of humor. He notes that the fly orchid (*Ophrys insectifera*), despite the name, is pollinated by a digger wasp. "It looks very different from the fly orchid flower. So different, in fact, that you really start to question the wasp's intelligence. How can it possibly be duped into thinking the orchid flower...is its star-crossed lover?" After explaining how the smell and feel of the fly orchid is the attraction, he concludes: "To the digger wasp, the fly orchid is a sex toy, not perfectly life-like but able to arouse the senses and cloy the mind."



Plant Hunting in Afghanistan

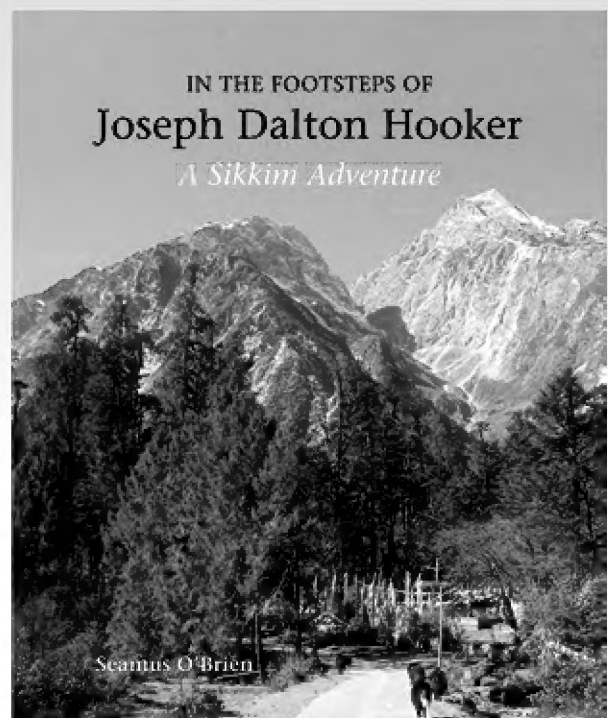
Christopher Grey-Wilson is a major author in the Miller Library collection: We have 24 of his books on the shelves. Many of these focus on specific plant groups, such as cyclamen, pasque-flowers, saxifrages and poppies of the genus *Meconopsis*. Others are excellent guides to alpine and rock garden plants. As you read these books, you learn that Grey-Wilson has considerable experience as a plant explorer. In "A Plant-Hunter in Afghanistan," he provides a detailed and fascinating account of his nine months of plant exploring through southern Iran and Afghanistan in 1971.

Why publish this now, almost 50 years after the events? The author claims other professional demands prevented him having the time, but he also reflects on the tragic changes to these countries, suggesting the need to document “the peaceful and welcoming country that I and my colleagues encountered in 1971.” In my reading, I certainly developed a greater awareness of the destruction caused by the upheavals that began just two years later.

Grey-Wilson’s writing is always quite accessible, but this book especially reads like a matter-of-fact journal. Some of the cultural clashes put the author and his colleagues in an unfavorable light, but the passages are left as they were written at the time in this self-published book. The author’s photographs were all taken on film during the trip and, although digitally enhanced, still evoke an earlier time.

In the Iranian city of Mashhad, Grey-Wilson was eager to photograph the golden dome of the tomb of Imam Reza and the turquoise-colored dome of the nearby Great Mosque of Goharshad. He knew that as a foreigner, he was not allowed within the sacred area enclosing these buildings, but the boundary was unclear. “I unfastened my camera and was just about to take the photo of a lifetime when a hefty clout on my shoulder almost sent the camera spinning to the ground, fortunately undamaged.” A group of local students recognized his confusion and led him to a permitted, if somewhat farther away, rooftop to take his photo.

Of course, the main purpose of the trip was to find plants, and Grey-Wilson and his companions were successful at that, finding 18 new species. Many plants are documented with photographs taken by the author, but this book is mainly a travelogue, and the photographs also effectively capture the often spectacular terrain, the human structures, the people, and the animals of this fascinating area. I recommend it to anyone interested in learning more about this region before the recent wars and terror; an interest in plants is not required. This is a limited edition book, so we’re not able to lend it out; but I urge spending time with it in one of the Miller Library’s comfortable chairs.



Plant Hunting in Sikkim

Seamus O’Brien is another modern-day plant explorer. Between 2012 and 2015, he led four tours of small groups to explore the rich flora of Sikkim, the tiny Indian state wedged between Nepal and Bhutan and butting up against the Himalayas. This landscape creates vast extremes in topography and climate, and an especially rich variety of plants in an area only slightly larger than King County.

Joseph Dalton Hooker (1817–1911) was one of the most prominent plant explorers of the 19th century, travelling to Antarctica, the Middle East, Morocco and western North America. He is arguably best remembered, however, for the three years he spent in and around Sikkim, from late 1847 to early 1851. At that time, Sikkim was an independent kingdom and the crossroads of several distinct cultures.

O’Brien wrote “In The Footsteps of Joseph Dalton Hooker” about his trips to Sikkim, skillfully weaving his travel stories around a biography of Hooker’s trip. “Unlike Hooker, our mission was not to collect, but to study and compare places he visited and to record how they had fared and appeared over 160 years later. In some ways Sikkim has changed little over the course of time.”

The main goal of each mission was finding plants, especially rhododendrons. Hooker discovered many, and confirmed and accurately described several other species for science. O’Brien’s group sought many of the same plants in the same locations where Hooker found them.

Each was also interested in the people and the animals of Sikkim.

The result is a rich dialogue between two eras. Many of the physical and floral features of Hooker's day are still there. An example is "Hooker's Rock," a gigantic boulder in the Lachen valley, probably deposited by retreating glaciers. Hooker sketched it in great detail and included a circle of seated villagers and a couple of enormous yaks in the foreground. O'Brien includes photos of the same rock, and even captured a large, black yak posed in front! Hooker also adopted a Tibetan mastiff named Kinchin to be his companion and fierce protector. Sadly, Kinchin perished during a river crossing, but

O'Brien was able to find similar—if somewhat more placid—dogs of the same lineage.

Seeds of many of the rhododendrons that Hooker sent home were planted at an estate in Kilmacurragh, County Wicklow, Ireland. Conditions there closely match the climate, soil and rainfall of Sikkim, and the plants are still flourishing. In 1996, the estate became part of Ireland's National Botanic Gardens, an annex to the main gardens in Dublin. In 2006, well before his own explorations, O'Brien took a position managing the Kilmacurragh garden. The awe he felt for the "Hooker rhododendrons" every spring gave him the incentive to see them in their native land.



ILLUSTRATING HOOKER'S RHODODENDRONS

Seamus O'Brien used mid-19th century publications by Joseph Dalton Hooker for guiding his 21st expeditions to Sikkim. The reason? These are still the best guides for exploring the flora in this region. For identifying the species, O'Brien turned to "Rhododendrons of the Sikkim Himalaya" published by Hooker's father, William Jackson Hooker. William used the notes, pressed specimens and sketches sent by his son to create this work, all before Joseph returned to England.

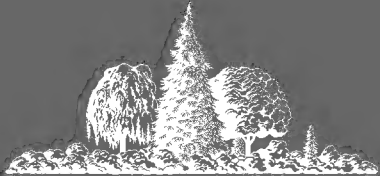
The most captivating aspects of this publication are the lithographs created by Walter Hood Fitch, considered one of the finest botanical illustrators of the time. "Fitch was quite rightly proud of his skill at infusing 'life' into the dried and damaged specimens and incomplete sketches through his illustrations," writes O'Brien.

These images are available to see in the Miller Library in "Joseph Hooker's Rhododendrons of Sikkim-Himalaya," a recent facsimile publication that includes helpful introductory information. The facsimile itself is a bit rare, and so not for lending, but is an easy and pleasurable read while visiting the library. ☺

BRIAN R. THOMPSON is the manager and curator of the Elisabeth C. Miller Library of the University of Washington Botanic Gardens. He is also a member of the "Bulletin" Editorial Board.

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